

ULTRASONIC INSERT WITH SOFT GRIP AND METHOD

The invention provides an ultrasonic dental scaler insert having a soft grip, and a method of making it.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a perspective view of an ultrasonic dental insert having a soft grip member in accordance with the invention in a handpiece with a cable.

FIGURE 2 is a cross-sectional side view of the ultrasonic dental insert in a handpiece of FIGURE 1, but without the cable.

FIGURE 3 is a perspective view of the ultrasonic dental insert having a soft grip member of FIGURE 1.

FIGURE 4 is a cross-sectional bottom view of an ultrasonic dental insert having a soft grip member of FIGURE 3.

FIGURE 5 is a perspective view of a soft grip member in accordance with the invention.

FIGURE 6 is a cross-sectional side view of the soft grip member of FIGURE 5.

FIGURE 7 is a perspective side view of half of a nozzle having grip layer.

FIGURE 8 is a perspective side view of half of the nozzle having grip layer of FIGURE 7, and positioned adjacent to an ultrasonic dental insert.

FIGURE 9 is a perspective side view of a nozzle having grip layer affixed to an ultrasonic dental insert in accordance with the invention.

DETAILED DESCRIPTION OF THE INVENTION

The invention is now described with reference to FIGURES 1 through 9. With more particular reference to FIGURES 1 and 2 it is seen that handpiece 10 comprises an elongated housing 12 which is adapted to receive insert 14 into one end. Cable 15 is attached at the opposite end of elongated housing 12. Cable 15 encloses hoses for delivering air, powder, and/or water to the handpiece 10. Cable 15 also encloses electrical wires connected to coils in elongated housing 12.

With more particular reference to FIGURES 3 through 6 it is seen that insert 14 has magnetostrictive stack 22 and tip 24 connected to opposite ends of connector 26. Connector 26 supports nozzle 25. Insert 14 has soft grip member 27 having a rigid polymeric inner wall 28 and elastomeric outer wall 30. Soft grip member 27 is press fit onto nozzle 25 of connector 26. Exemplary, rigid polymeric material for use in accordance with the invention include Nylon 6; Nylon 6,6; polypropylene and liquid crystal polymer.

The elastomeric material of outer wall 30 provides a soft, non-slip grip surface for the user to hold onto insert 14. Elastomeric material of outer wall 30 functions as a vibration absorber (or vibration insulator) to reduce the amount of vibration transferred to hand of the user holding insert 14. Nozzle 25 is preferably made of rigid polymeric material. Magnetostrictive stack 22, tip 24 and connector 26 are preferably made of metal.

Preferably, elastomeric outer wall 30 is molded onto rigid polymeric inner wall 28. Elastomeric material may be applied to rigid inner wall 28, for example, by injection molding of fluid, which forms elastomeric material. Preferably, as the elastomeric material solidifies to form the elastomeric material of outer wall 30, a bond forms between the elastomeric material and the rigid material of inner wall 28. Preferably this bond retains its strength in a sterilizing environment. A sterilizing environment may, for example, be heated to 135 °C for 14 minutes at 220 kPa pressure. Preferably, all of the materials used are autoclavable. Alternatively, outer wall 30 and inner wall 28 are separately molded. Then outer wall 30 and inner wall 28 are adhered together by applying an adhesive layer between them.

With more particular reference to FIGURES 7 through 9 it is seen that insert 114 has magnetostrictive stack 122 and tip 124 connected to opposite ends of connector 126. Connector 126 supports nozzle 125. Insert 114 has soft grip member 127 having a rigid polymeric half nozzle walls 128 and 129 and elastomeric outer walls 130 and 131. Two halves of nozzle 125 are positioned to circumscribe connector 126. Then the two halves of nozzle 125 are adhered together.

Preferably elastomeric outer wall 130 is molded onto rigid polymeric half nozzle wall 128, for example by injection molding. Similarly, elastomeric outer wall 131 may be molded onto rigid polymeric half nozzle wall 129, for example by injection molding. Thus, elastomeric outer wall 130 may be molded onto rigid polymeric material of half nozzle wall 128 by injection molding of a fluid which forms the elastomeric material. Similarly, elastomeric outer wall 131 may be molded onto rigid polymeric material of

half nozzle wall 129 by injection molding of a fluid which forms the elastomeric material. Preferably as the fluid forms the elastomeric material of outer wall 130 it forms a bond to the rigid polymeric material of half nozzle wall 128. Similarly, as the fluid forms the elastomeric material of outer wall 131 it forms a bond to the rigid polymeric material of half nozzle wall 129.

Alternatively, elastomeric outer wall 130 and half nozzle wall 128 may be adhered together by applying adhesive between them. Similarly, elastomeric outer wall 131 and half nozzle wall 129 may be adhered together by applying adhesive between them. Preferably, these bonds effectively retain their strength in a sterilizing environment. The elastomeric material of outer walls 130 and 131 provides a soft, non-slip grip surface for the user to hold insert 114. Also, elastomeric material of outer walls 130 and 131 functions as a vibration insulator for the user holding insert 114.

Nozzle 125 is preferably made by adhering half nozzle wall 128 to half nozzle wall 129. The adjacent sides of elastomeric material of outer walls 130 and 131 are preferably adhered together. Magnetostrictive stack 122, tip 124 and connector 126 are preferably made of metal. In use the insert 114 with nozzle 125 and elastomeric outer wall 130, is inserted into an elongated housing, such as elongated housing 12 to form a dental handpiece for ultrasonic cleaning of teeth.

Thus, in accordance with the invention is provided a method of making an ultrasonic dental scaler insert having a soft grip. This ultrasonic dental scaler insert is made by providing a soft grip member having an elastomeric wall affixed to a rigid wall, and connecting the soft grip member to an ultrasonic dental scaler insert to form an ultrasonic dental scaler

insert having a soft grip. The ultrasonic dental scaler insert has a tip, a connector, and a magnetostrictive member. The connector has a first connector end connected to the tip, and a second connector end, connected to the magnetostrictive member. In one embodiment of the invention the rigid wall is generally cylindrical, and the soft grip is snap-fit onto the connector. In another embodiment of the invention the nozzle is formed by the rigid wall.

While present embodiments of the invention and methods of practicing the same have been illustrated and described, it will be recognized by those skilled in the art that this invention may be otherwise variously embodied and practiced within the scope of the following claims.